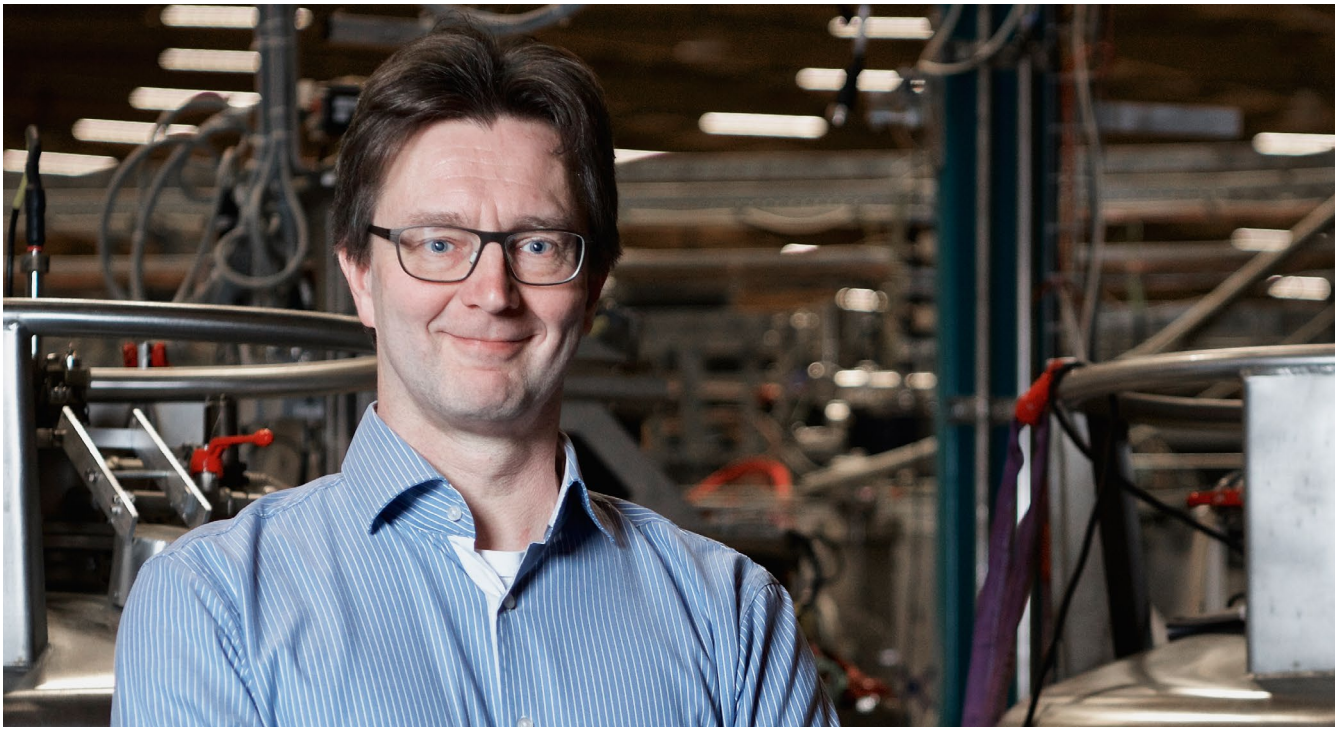
Frithjof Nolting is a specialist in analyses using the Swiss Light Source

Professor Frithjof Nolting is head of the Laboratory for Condensed Matter in the area of photon research at the Paul Scherrer Institute and a titular professor at the University of Basel's Department of Physics. Driven by a fascination for the magnetic properties of tiny nanosystems, he and his team study one- to three-dimensional systems using a range of instruments. Chief among these is the Swiss Light Source (SLS), whose light is emitted by electrons moving on a circular path at nearly the speed of light. The wavelength of the light can be adjusted precisely between those of UV and X-rays, allowing analysis of a wide range of materials.



Frithjof Nolting leads the Laboratory for Condensed Matter in the area of photon research at the PSI and teaches as a titular professor at the University of Basel's Department of Physics. (Image: Paul Scherrer Institute)

Electronic and magnetic interactions

His own research work focuses on electronic and magnetic interactions on the nanometer scale: What happens at the boundary layer between two materials? How do magnetic properties come about and how can they be modified and optimized in a targeted manner? Can lasers or electric fields be used to alter magnetization? These are all key questions when it comes to developing the scientific basis for new data storage technologies, for example.

Crystal defects have a major influence

Highlights in 2018 included an analysis of the correlation between magnetic and atomic structure in nanoparticles, with the surprising result that so-called crystal defects (deviations from the perfect crystal structure) have a greater influence on magnetic behavior than previously thought.

A wide range of topics

In addition to Nolting's own research, in the Laboratory for Condensed Matter are also six different research groups that study a wide range of topics. These range from materials for new manufacturing technologies to topological materials and ultra-fast processes in solids. In addition, these groups develop and operate experimental stations at the SLS and at SwissFEL, the X-ray laser at the Paul Scherrer Institute, and make these stations available for use by other research groups.

One key highlight in 2018 was the successful commissioning of the "Bernina" experimental station at SwissFEL. This allows researchers to study ultra-fast processes in solids and thus to gain important insights into the origin of magnetic properties.